

# MINING

On its 25th birthday

## *Highway* Looks to the Future!



1958 marks the 25th anniversary of the founding of Highway Equipment Company.

This new year finds Highway not only proud of its successful past, but looking forward confidently to an even greater future.

The Highway organization of 158 persons is able and eager to serve you.

22 capable, experienced field representatives are always happy to share your equipment problems. They consider it a privilege to help you select the most efficient, most economical modern equipment for your job. These men each average over 11 years of Highway service.

Operating 'round-the-clock, our parts and service departments cut your downtime to a minimum, assure that your work will continue steadily without interruption. And—we back every manufacturer's guarantee with our own iron-clad warranty.

Highway looks to the future, while thanking you for your past friendship and patronage which has made possible our continued growth and progress.



### HIGHWAY EQUIPMENT COMPANY

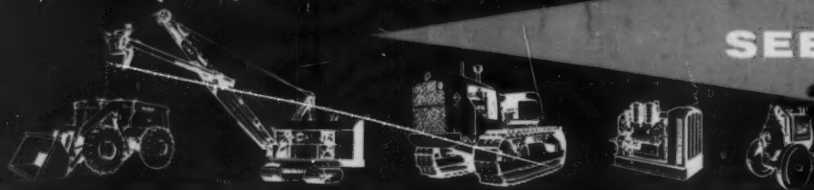
6465 Hamilton Ave. • Pittsburgh 6, Pa.

Allis-Chalmers • Lima Shovels, Cranes, Draglines • Master General Motors Diesel Engines • Power-Pack Conveyors Gar Wood • Lima Roadpackers • Burmeister Mixers and Bins Michigan Tractor Shovels and Excavator-Cranes Thor • Jaeger

For the best in all types of mining  
equipment...

SEE

*Highway* FIRST!



*if...*

you are interested in the substantial operating savings  
inherent in the use of the best in mining equipment  
... you should be a customer of

*Highway*



ALLIS-CHALMERS • LIMA SHOVELS,  
CRANES, DRAGLINES • MASTER •  
GENERAL MOTORS DIESEL ENGINES •  
JAEGER • LIMA ROADPACKERS • THOR  
POWER-PACK CONVEYORS • MICHIGAN  
TRACTOR SHOVELS AND EXCAVATOR-CRANES  
GAR WOOD • BURMEISTER MIXERS AND BINS

*Highway*



**EQUIPMENT COMPANY**

6465 Hamilton Ave. • Pittsburgh, Pa.

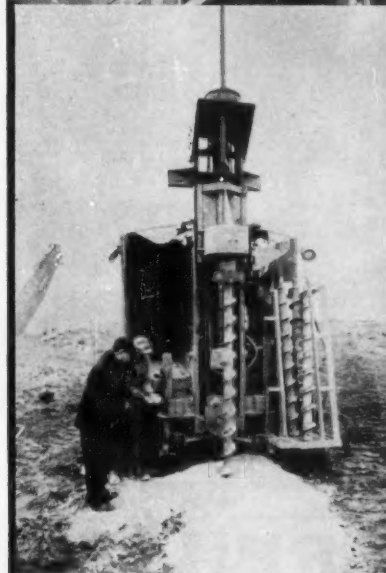
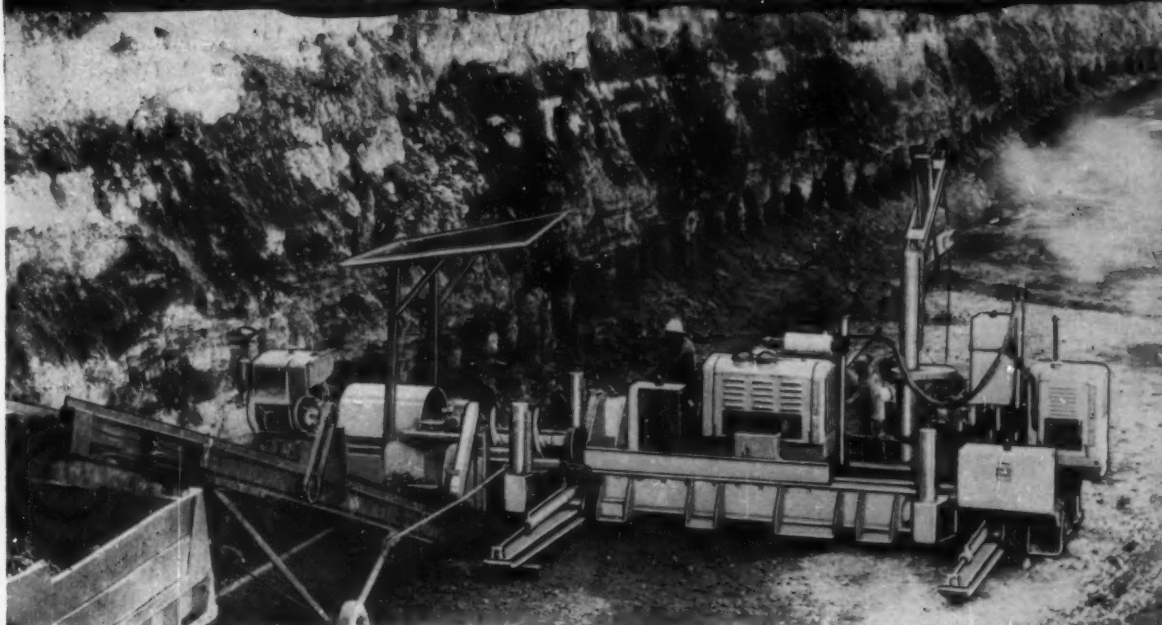


Lima 2400 stripping overburden for  
BORON COAL CO., Bald Hill, Pa.

# CUT MINING COSTS

WITH **HEAVY - RUGGED - POWERFUL**

## McCARTHY AUGER DRILLS



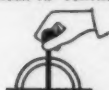
### VERTICAL MODEL 106-24

**World's Fastest Heavy-Duty  
Vertical Auger Drill**

Bores faster, deeper, larger dia. holes than any other auger drill. New gear reduction unit slows auger rotation for operation in hard rock formations. Drills 8" and 9" dia. holes readily in shale and sandstone formations, drills larger dia. holes up to 24" dia. in softer formations.

**Write for Bulletin M-100**

#### FINGER-TIP CONTROL



Gives Desired Rotating  
Speed Of Auger

#### HYDRAULIC FEED



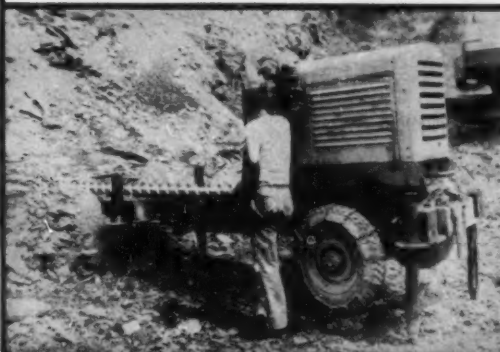
Provides Any Speed Up To 6 Feet  
Per Minute Horizontal  
Feed Of Drill

### COAL RECOVERY

**"Walks" from hole to hole to auger  
high-quality Bonus Coal**

An Ohio miner removes 450 tons of coal in each 6 1/2-hour working day with this Model 14 36-42 x 12' McCarthy drill, operated by two men. He drills 42" dia. holes 144' deep. Auxiliary conveyor eliminates spillage at hole. It operates on either side of drill for working blind cut. Twelve different models of McCarthy Coal Recovery Drills mine low-cost "bonus coal."

**Write for Bulletin M-101 and M-102**



### HORIZONTAL MODEL 104

**Lowest Drilling Costs per  
foot, Self-Propelled or  
Truck-Mounted**

Bores up to 12" dia. holes to 150' depth faster, cheaper than any other horizontal drill. Requires less working space, saves many man-hours. . . operates easily in tight, hard-to-reach locations.

**Write for Bulletin M-105**

## THE SALEM TOOL CO.

SOUTH ELLSWORTH AVENUE

SALEM, OHIO. U. S. A.





*"We have doubled the amount  
of dirt we move since purchasing  
the Cat D9 and that means  
twice the coal output"*



*John A. Thompson*

**John A. Thompson  
Coal Co.  
Bigler, Penna.**



Mr. Thompson bought his Cat D9 in August of 1956 and uses it on a coal stripping operation near Hyde, Pennsylvania. The D9 opens ahead of the stripping shovel and also back fills. There are 18 to 50 feet of overburden to be removed from a 30 to 32 inch seam of "B" vein bituminous coal. Mr. Thompson operates the D9 about 16 hours per day and, as he states above, is "well satisfied." He also claims, "The D9 is perfect for this type of work. We have plenty of power and the fact that everything is hydraulic makes that power easy to handle."

**CATERPILLAR**

**WANTED...  
THE HARD WORK**

\*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



# INCREASE YOUR COAL OUTPUT with CATERPILLAR\* D9 TRACTOR FROM BECKWITH

For more than two years now, the Cat D9 has been in operation on tough coal stripping jobs and has met with overwhelming acceptance. The new 320 Flywheel Horsepower D9 is engineered for bigger-than-ever jobs . . . to increase your coal output . . . to make you more money . . . to speed backfilling . . . to break its own production records.

In no other type of business is the demand so great for proper balance of power, weight, traction and maneuverability at lowest cost. No other tractor meets these demands as well as the Cat D9.

If you want to step up production let us demonstrate the pace-setting D9 on your job. It has power aplenty with 260 HP at the drawbar and yet handles easier than most smaller tractors because of hydraulic boosters which provide easy steering, braking and clutching. Best of all, it's built to stay on the job week after week, month after month with a minimum of downtime because it's rugged and easy to service.

Name the date and we'll demonstrate either the D9 with torque converter or direct drive with oil clutch. Give us a call today!

## COMPARE THESE SPECIFICATIONS

### TORQUE CONVERTER DRIVE

**HORSEPOWER:** (Rated at sea level)  
Engine HP at Flywheel . . . . .320

**OPERATING PERFORMANCE DATA:** Drawbar pull—The Torque Converter drive will automatically adjust drawbar pull to the load within the following speed ranges.

Gear	Forward	Reverse
1	0-4.1	0-4.1
2	0-5.9	0-8.1
3	0-8.1	

**ENGINE:** Four-cycle, valve-in-head, turbocharged, diesel  
Number of cylinders . . . . .6  
Bore and stroke . . . . .6 1/4" x 8"  
Piston displacement . . . . .1473 cu. in.  
RPM—governed at full load . . . . .1240  
N.A.C.C. horsepower rating for tax purposes . . . . .93.6  
Lubrication (full flow filtering) . . . . .Full pressure  
Crankshaft . . . . . "Hi-Electro" hardened journals  
Bearings (Precision-type steel-backed aluminum alloy) . . . . .7 main bearings  
Fuel injection system . . . . .Caterpillar-built

**CLUTCH AND TORQUE CONVERTER:** Dry-type, single asbestos-faced plate with over-center engagement. Three-stage torque converter using engine fuel for hydraulic fluid. Connected to transmission by double universal joint.

**GENERAL DIMENSIONS:** Gauge . . . . .90"  
Length (over-all) . . . . .17' 10 3/4"

Height (measured from tip of grouser of standard track shoe to highest point, exclusive of exhaust and precleaner) . . . . .8' 9"  
Width (over-all) . . . . .9' 11 1/4"  
Height drawbar above ground (measured from lower face of standard track shoe) . . . . .21 7/8"  
Ground clearance (measured from lower face of standard track shoe to lowest point of bevel gear case) . . . . .20 1/2"

**WEIGHT:** Operating (approx.) . . . . .58,745 lb.

### DIRECT DRIVE

**HORSEPOWER:** (Rated at sea level)  
Drawbar . . . . .260  
Engine HP at Flywheel . . . . .320

#### OPERATING PERFORMANCE DATA:

Travel Speeds At Rated Engine RPM	RPM	Std. Trans. Gear	Drawbar Pull (lb.)	
			Rated	Max.
1.7	150	1	54,200	63,000
2.2	194	2	44,600	52,500
3.0	264	3	30,900	36,600
3.9	343	4	22,400	26,800
5.0	440	5	16,800	20,200
7.0	616	6	10,800	13,450

Reverse (same as forward—6 gears)  
Maximum drawbar pulls are calculated from rated pulls and based on the torque increase as the engine slows down under load. The maximum available pull will de-

pend on traction and weight of the fully equipped tractor.

**ENGINE:** Four-cycle, valve-in-head, turbocharged, diesel  
Number of cylinders . . . . .6  
Bore and stroke . . . . .6 1/4" x 8"  
Piston displacement . . . . .1473 cu. in.  
RPM—governed at full load . . . . .1240  
RPM—at maximum drawbar pull (point of maximum torque) . . . . .900  
N.A.C.C. horsepower rating for tax purposes . . . . .93.6  
Lubrication (full flow filtering) . . . . .Full pressure  
Crankshaft . . . . . "Hi-Electro" hardened journals  
Bearings (Precision-type steel-backed aluminum alloy) . . . . .7 main bearings  
Fuel injection system . . . . .Caterpillar-built

**TRANSMISSION:** Unit construction. Selective-type speed change. Constant mesh helical gears. Filtered, full pressure lubrication for bearings—oil spray directed on gears.

**GENERAL DIMENSIONS:** Gauge . . . . .90"  
Length (over-all) . . . . .17' 10 3/4"  
Height (measured from tip of grouser of standard track shoe to highest point, exclusive of exhaust and precleaner) . . . . .8' 9"  
Width (over-all) . . . . .9' 11 1/4"  
Height drawbar above ground (measured from lower face of standard track shoe) . . . . .21 7/8"  
Ground clearance (measured from lower face of standard track shoe to lowest point of bevel gear case) . . . . .20 1/2"


**WEIGHT:** Operating (approx.) . . . . .59,095 lb.

# BECKWITH

## MACHINERY CO.

BRADFORD, PA. • 361-369 Congress St. • Phone 3166  
CLEARFIELD, PA. • Old Town Rd. • Phone 5-9635  
ERIE, PA. • 1356 E. 12th St. • Phone 4-2494  
FARRELL, PA. • E. Broadway • Phone DI. 6-3572  
CLARKSBURG, W. VA. • U.S. Rt. 20 • Phone Main 4-5476

6550 Hamilton Avenue • PITTSBURGH • Phone: MONTROSE 1-6900



Simple, balanced design allows this 6-yd. Manitowoc Model 4500 drag to get over-flowing buckets right at the edge of the cut.

# Bigger Bites

## MANITOWOC DESIGN PUTS ALL THE POWER TO WORK

There's no wasted horsepower with a Manitowoc Model 4500. Intelligent design forethought has reduced power-robbing extra parts throughout this big capacity mining machine. In fact, there are only 15 gears and 8 sprockets! And *only working gears turn* . . . Manitowoc's exclusive slide pinion arrangement disconnects all others until their function is needed. Even many *small* excavators don't have simplicity of design like this!

Powered by a single diesel power package rather than a series of independent electric motors, the 4500 has the get up to go anyplace . . . unhampered by trailing electric power cables. There's no downtime due to the failure of delicate electric switches, control boards or miles of wires. Put more power to work in *your* mine with a fast digging, long reaching Manitowoc 4500 shovel or dragline. A call to your Manitowoc distributor will bring all the facts.

**MANITOWOC ENGINEERING CORP.** Manitowoc, Wis.

**GREATER SPEED AND POWER—LESS DEAD WEIGHT**

**TRUE MOBILITY TO MAKE MINING PROFITABLE ANYWHERE**

**GREATER STABILITY PRODUCES FULL BUCKETS, LOWER GROUND PRESSURE**

**DRAG TRAVELS ANYPLACE WITH A LOW, LOW TRAVEL CLEARANCE OF ONLY 17' 2"**

**BONUS CAPACITY IN ANY MATERIAL—MANEUVERABILITY OF A SMALL MACHINE**

**BASSLER EQUIPMENT CO.**  
FORTY FORT, PA

**ANDERSON EQUIPMENT CO.**  
BRIDGEVILLE, PA.

# COAL MINING

Vol. XXXV

January, 1958

No. 1

## Contents

Do You Know .....	7
Here and There in the Coal Industry .....	7
Cooling System Care .....	9
Staffing a New Mine .....	12
Seen at Open Pit Mining Assn. Picnic Last Summer .....	18
Respirators Protect Miner's Health .....	22
Advertisers' Index .....	28

Published by

### Modern Mining Publishing Company

4575 Country Club Drive, Pittsburgh, Pa., Phone TU. 1-9411

P. F. JASIK, Publisher and Editor  
Philadelphia Representative

PAUL S. KEISER, 1729 Ridgeway Road, Havertown, Pa.

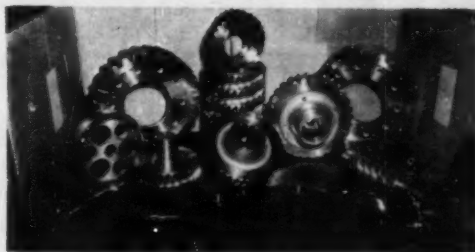
Printed by

### ADVANCE PRINTING & LITHO CO., INC.

1118 Chestnut Street

Erie, Pa.

Phone 2-2780



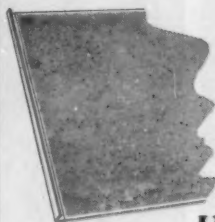
**BRONZE, HELICAL and WORM GEARS**  
unconditionally guaranteed

### Licking View Tool & Machine Co.

CAMDEN ROAD

ZANESVILLE, OHIO

Distributed by: BEARING, INC.



## Laubenstein

Perforated Screen and Plate  
MINING — INDUSTRY

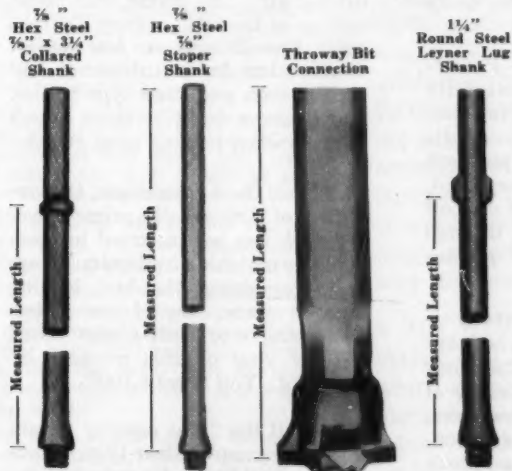
for  
Centrifugal Dryer Plates  
Step Screens  
Conveyor Buckets - Flights

### HAROLD C. LUSK CO.

924 Park Ave.  
Pittsburgh 34, Pa.  
LOcast 1-41915210 Kentucky St.  
So. Charleston 6, W. Va.  
POpular 8-6258

## TOOLS from MARS

Pittsburgh Call Zenith 0861 • Mars Call National 5-4688



Drill Steels Furnished with Any Type End  
Reconditional Service

### ROBERT T. WOODING'S INC.

MARS, PENNA.

Distributed by

### LEE SUPPLY CO.

P. O. BOX 3

CHARLEROI, PENNA.

PHONE HUDSON 3-8933

**Vertical Rotary Drilling**  
**Contract Hourly Lease**  
**Blast Test Core Drilling**



### MOON & SONS, INC.

EQUIPMENT RENTAL

P. O. Box 753

139 South Eighth Street

Connellsville, Pa.

Office Phone MA 8-8639

Res. Phone MA 8-4393

Warehouse Phone MA 8-1900



# Can your haul units match these advantages?



**Before you buy your next off-road hauling unit, make this test to see if you are getting the most for your money. Examine the various makes of haulers in the light of these features — standard on LeTourneau-Westinghouse Rear-Dumps:**

**Hauls anywhere** — With big, low-pressure tires, L-W Rear-Dumps safely haul capacity loads over rutted haul-roads, paved highways, city streets... haul cross-country over rough terrain, over rocky pit floors... through mud, sand, and over soft fills.

**Maneuvers easily** — 180° turns — within distance of less than its own length — plus power-steer, quickly positions Rear-Dump under dipper. Time normally wasted by conventional haulers jockeying back and forth to spot at shovel or fill is eliminated. Big, square-type body target speeds loading.

**Dumps fast, clean** — Flick of an electric switch actuates hoist-motor. Body lifts quickly to any desired angle, for spreading on the run... or for dumping over bank. At full-dump position, bowl is behind rear wheels, so dump is clean, doesn't

"bury" wheels. Streamlined body sheds material readily.

**Cuts weather delays** — Power-transfer differential automatically applies up to 80% of power to drive-wheel on firmest footing... pulls unit through mud, sand and soft materials which stop ordinary haulers. Front-wheel drive pulls unit off soft fills readily. Pivot-turn, through geared kingpin, "walks" prime-mover out of soft spots.

**Provides maximum safety** — Multi-disc air brakes have more wheel braking surface than any other type hauler. Low center of gravity, good visibility, power-steer, front-wheel drive, easy electric controls... all contribute to operator's confidence and safety.

**Reduce maintenance** — Having no hydraulics or jack-lines, no long

drive-shaft... no frame, sub-frame, springs or tie-rods... these Tournapull® Rear-Dumps are less subject to downtime for maintenance and repairs than any other type hauler. Slant-bottom bowl reduces shock damage when loading large chunks.

Add to all these advantages, the versatility of Tournapull's prime-mover — which can be converted to operate these matching trail units: scraper, bottom-dump, flat-bed, logging arch, or crane. Any of these interchangeable work-units cost about 25% of your original machine investment. You benefit 100%.

Check all the "plus earning advantages" Tournapull Rear-Dumps have to offer YOU! Ask for complete details on the size that fits your needs: 11-ton "D", 22-ton "C", or big 35-ton "B", each a profit-maker.

R-1056-DC-1



## Furnival Machinery Co.



Lancaster Avenue at 54th Street  
PHILADELPHIA 31, Penn.  
Phone: Trinity 7-5200

5105 Paxton Street  
P.O. Box 786  
HARRISBURG, Penn.  
Phone: CEDar 8-1781

S. Water St., P.O. Box 553  
(Pottsville Region)  
NEW PHILADELPHIA, Penn.  
Ph Market 2-8020

### Also Sales & Service for:

- Jackson Vibrators
- Chain-Belt Rex Products
- Cleveland Trenchers
- Ingersoll-Rand Compressors
- Marion Power Shovels
- John Deere Industrial Tractors
- Quick-Way Truck Shovel Co.

## Do You Know?

• Engineers may have to resort to "daydreaming, wild imaginations, and hair-brained ideas" in order to equip airplanes for supersonic flight, the Society of Automotive Engineers learned here today.

This is particularly true of electrical equipment, which is becoming more and more important as vehicles fly faster and higher, Victor B. Hart of the Boeing Airplane Company told the SAE National Aeronautic Meeting.

"With the advent of vehicles into the supersonic regions of flight," Mr. Hart pointed out, "the environmental problems have increased by several orders of magnitude over that which has ever been experienced before."

These problems, such as higher temperatures and acoustical noises, have already made obsolete for supersonic flight most of the electrical materials now in use, Mr. Hart said.

Because the use of electrical systems is so important to supersonic flight, Mr. Hart warned, unless new materials are developed or invented, this may well become the limiting factor in man's attempt to fly at supersonic speeds.

The Boeing engineer concluded that "application of daydreaming, wild imaginations, and hair-brained ideas may have to be applied from now on and into the future if electrical designers are going to supply equipment which will operate in vehicles that continually are going to fly faster and faster, and higher and higher."

The long-sought dream of medical men, the use of skin or body organs from one person to replace diseased or damaged parts in another, is a little nearer realization.

Research at the University of California at Los Angeles Medical School has demonstrated that tissue from one animal may adapt itself to that of another under certain conditions.

The research was carried out by Dr. Jack Cannon, Dr. Paul Terasaki and Dr. William Longmire.

Skin from day-old chicks can be successfully cross-grafted. But when the chicks mature, grafts involving their "former skin" will not take. This suggests that the donor skin has adapted itself to the host so that it is now specific to the host.

The experiments further indicate that tissue specificity, which causes an individual to reject tissue from another, may be a function of the immune mechanism. Until the immune mechanism is fully developed, tissue specificity may not exist. (The immune mechanism is responsible for resisting foreign bodies such as germs).

The investigators suggest that the possibility of tissue adaptation to the host should be further investigated. The major research emphasis to date has been on making the host tolerant to the graft, which would seem to be a more complex approach.

## HERE AND THERE IN THE COAL INDUSTRY



N. T. Camicia

• Mr. N. T. Camicia, Holden, West Virginia, has been elected Vice-President and General Manager — Operations of Island Creek Coal Company.

Mr. Camicia's previous position with Island Creek was General Manager of Mines, to which he was appointed on January 1, 1955.

Mr. Camicia, a West Virginian by birth, received his high school education at Welch High School and was graduated from Virginia Polytechnic Institute with a B. S. degree in mining engineering in 1938. He became associated with Island Creek immediately after graduation and has continuously served the company in many capacities, except during military absences.

• The bituminous coal industry, major coal users, and companies which supply materials and equipment to the coal industry have joined in an effort to establish a major coal research center in Pittsburgh to be operated by the bituminous coal industry. ■ ■

Dr. A. A. Potter, president of Bituminous Coal Research, Inc., the national research association for bituminous coal, which will have the responsibility for operating the new facility, said today that this development climaxes several

months of cooperative planning by executives of the coal industry and major Pittsburgh industrial companies which are financially affected by the progress of coal research.

Merle C. Kelce, president of Peabody Coal Co., of St. Louis, has accepted membership on the Board of Directors of National Coal Association.



LEWIS C. BLACK

Lewis C. Black has been appointed assistant general sales manager in charge of sales of large machines and blast hole drills by Bucyrus-Erie Co., South Milwaukee, Wis. He had been sales manager-large machines.

Black joined Bucyrus-Erie as a special apprentice in 1935, soon after his graduation from Lehigh University with a B. S. in mining engineering.

He served at the Chicago and St. Louis offices as a district representative for small machines from 1937 through 1942, when he transferred to Kansas City as a district representative for large machines. He was transferred to New York in 1949. In October 1955, Black was appointed assistant eastern district manager. He served in this capacity until his appointment as sales manager-large machines July 1 1956.

For your blast holes up to 12 in. diam., buy the

### ← REICH 750

The heaviest truck-mounted blast hole drill on the market. Hole sizes up to 12 in. Down pressure to 37,200 lbs. Also furnished on extra heavy self-propelled crawlers, or crawler-tractor mounted, with down pressure to 40,000 lbs.

In sandstone and shale the Reich 750 has drilled at the rate of

**238 ft. per hour**



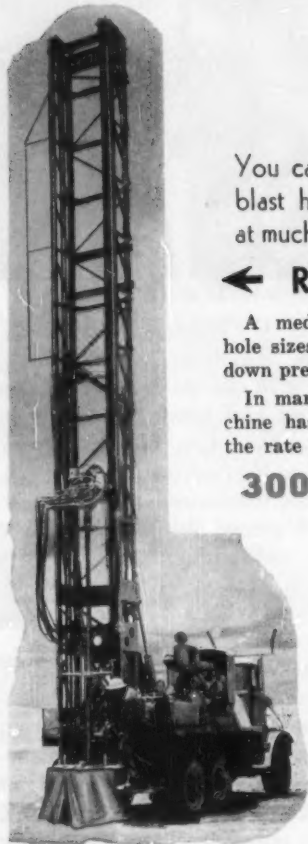
You can drill more 6-in. blast hole than machines at much higher price with

### ← REICH 450

A medium weight drill for hole sizes up to 6 in. diameter; down pressures up to 20,000 lbs.

In marine limestone this machine has drilled blast hole at the rate of

**300 ft. per hour**



## Do you want **MORE** blast hole at **LOWER** cost?

Find out what the owners of Reich Drills are doing — in some cases putting down more hole with *one* Reich than with *two* other rotaries.

Why you get much bigger production at lower cost with a Reich:

**Your operator is faster** — right up to quitting time. The easiest operated machine on the market — *a real one-man drill*. Minimum levers, and hydraulic power does the hard work. All operations handled at the driller's station.

**Add a drill stem in seconds** instead of minutes — the Reich's far faster stem-loading saves time and money on every hole, whether you use the Reich barrel loader or hydraulic stem loader.

**Driller can instantly hit exactly right rotation speed** for each stratum, from hardest to softest. The only hydraulic rotary that has *infinitely variable* drill rotation speed.

**Lower bit cost** — by far. When the bit bites rock, instantly the operator cuts down speed and saves the bit from being ruined. Average bit life in some cases is  $2\frac{1}{2}$  times that of other rotaries.

**Extra strength you can SEE.** The Reich drill has been perfected by an unequalled experience in building top drive hydraulic rotaries. There's an extra margin of strength wherever needed — *compare the pumps, motors, gears, frames* — and all other vital parts. You save many dollars of upkeep expense, and valuable drilling time.

**Find out the extra profit** you'll make with the Reich. Records made by these rigs are not secrets—inquire of owners nearest you. We'll tell you where they are. Or we'll be —

**Glad to give you a demonstration** on your own work. Write, wire or phone —

**FRANK SWABB EQUIPMENT CO.**

Hazleton National Bank Bldg., Hazleton, Pa.

Phone GLadstone 5-3658

It will pay you to buy what **REICH** has for you **NOW**

(You'll out-drill the machines being built like the Reichs of several years ago.)



# COOLING SYSTEM CARE

## *Pays Big Dividends*



A clogged crankcase guard can cause the cooling system of crawler tractors to overheat. Dust, mud and other debris act as insulating materials preventing the escape of heat from the crankcase or torque converter. Frequent inspections when operating under adverse conditions will prevent the accumulation of unwanted materials.

The cooling systems of the diesel engines of most earthmoving machines are similar in design. Additional items such as an oil cooler, a torque converter, or cab heater vary the basic system only slightly. The small amount of time required to properly care for this system will result in better machine performance, longer engine life and less down time.

Two schematic diagrams, Figures 1 and 2, show the basic cooling system found on most crawler tractors. In Figure 1 the cooling system is operating with the temperature regulators closed—a normal condition when the temperature of the coolant is less than ap-

proximately 170° F. With the temperature regulators closed, coolant is circulated by the pump only through the cylinder head, block and regulator housing. A by-pass in the regulator housing returns the coolant to the pump inlet.

The second diagram, Figure 2, shows the cooling system operating above 170° F. With the temperature regulators open. Here the coolant is allowed to flow into the radiator permitting the maximum cooling capacity of the system to be used. These two diagrams illustrate the function of temperature regulators—the “watchdogs” of the cooling system.

Too often, however, regulators

By V. A. WOODLING

Manager Service Training  
Caterpillar Tractor Co.

*A diesel engine's overheated cooling system can mean profit-losing down time. Here are some ways to keep cooling systems in good working order.*

are unjustly accused of causing an engine to overheat. Usually the first thought is to remove and discard them at the first sign of overheating. Don't jump to this conclusion. Actually, overheating can result from a number of defects and incorrect operating procedures.

Before removing and discarding temperature regulators, a systematic check of the cooling system should be made. Ordinarily, the

radiator fins and around the engine is equally essential to adequate cooling. Inspect the radiator core fins to see if they are damaged or bent or simply plugged with mud or trash. A loose fan belt or bent fan blade is also a common cause of overheating. Operating a diesel engine at continuous overload is another.

If, after checking these items, the cause of overheating is not

at normal operating temperatures with the regulators removed, it is evident that they are at fault and new regulators should be installed. Do not operate the engine any longer than necessary with the regulators removed.

Air in the cooling system is another common cause of engine overheating. Air can enter the system in several ways. The most probable causes are low coolant level, a loose or damaged precombustion chamber gasket (see Figure 3) or loose head stud nuts.

Air in the cooling system can result in cracked cylinder heads or other serious engine damage. If not quickly exhausted from the cooling system after completely filling the radiator, air will displace water from the cylinder head, allowing the normally hot parts to operate at even higher temperatures.

A simple check, sometimes called the "bottle test" (see Figure 4), will indicate if air is present in the system. The equipment required to perform this check consists of a bucket of water, a length of hose which will fit over the radiator overflow tube and a quart bottle.

To begin the test, fill the cooling system and operate the engine

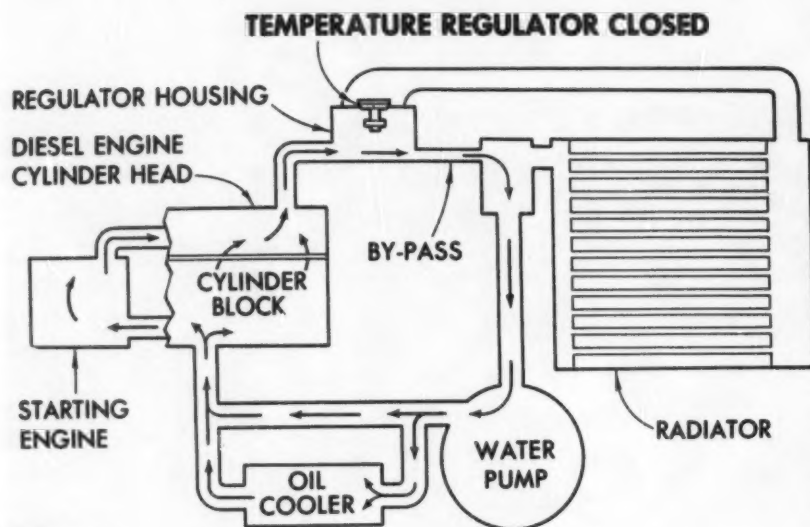


Figure 1

first indication of overheating is noted on the temperature gauge. It should not be assumed that the temperature gauge is always correct. First, remove the radiator cap (caution should be exercised when doing this on a pressurized system), and insert a reliable thermometer into the coolant. This should be done with the engine running since coolant temperatures in the top tank rise immediately after shutting down an engine. If the thermometer indicates that the engine is overheating, a systematic check should be made to determine the cause. Begin with an inspection of the radiator core by looking for signs of scale, dirt or other clogging agents. Using soft water and a rust inhibitor recommended by the machine's manufacturer will greatly reduce scale and rust deposits in the system.

A free flow of air through the

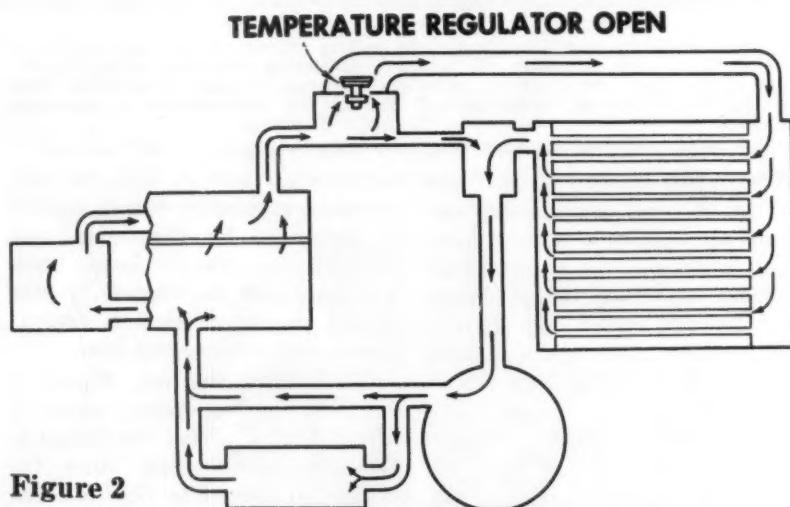


Figure 2

found, remove the temperature regulators. If the engine still overheats with the regulators removed, they are not the cause of the trouble and should be reinstalled immediately. Should the engine run

at high idle for at least five minutes after the engine reaches operating temperature. Shut the engine down, make sure that the radiator cap is tight and place the rubber hose over the end of the overflow tube.

Fill the bottle with water, insert the loose end of the hose into the bottle and invert the bottle in the bucket filled with water. Start the engine and operate it at high idle. The following water displacement rates are considered maximum: Four and six cylinder engines — one pint per minute; eight cylinder engines — one pint per 40 seconds; twelve cylinder engines — 1 quart per minute. If the water is expelled from the bottle in less time, air or gas leakage into the system is excessive and the source must be located and corrected. Continued operation with excessive air or gas flow into the system may result in serious engine damage.

Further possible causes of overheating may be in the water pump, or from restrictions in the water jacket, lines or hoses. One cause of overheating which should not be overlooked when trouble shooting crawler tractor cooling systems is a clogged crankcase guard. Dust, mud and other debris are good insulating materials which may cause the temperature of crankcase oil or torque converter fluid to be raised to such an extent that overheating in the cooling system occurs. Frequent inspection of the guard can prevent this problem.

Overheating of track-type tractor's diesel engine equipped with torque converter may result from several reasons other than those previously listed, since torque converter cooling is usually a function of the basic cooling system.

A torque converter, like most units transmitting torque, operates more efficiently through a certain range. The most efficient point of operation is when output shaft speed is equal to approximately one-half input shaft speed. However, satisfactory operation can be obtained when output shaft speed is as low as one-third or as high as three-fourths of input shaft speed. When the output shaft operates for extended periods of time at speeds that are lower or higher than the recommended speed range, the torque converter may overheat. Operation in the zero to one-third

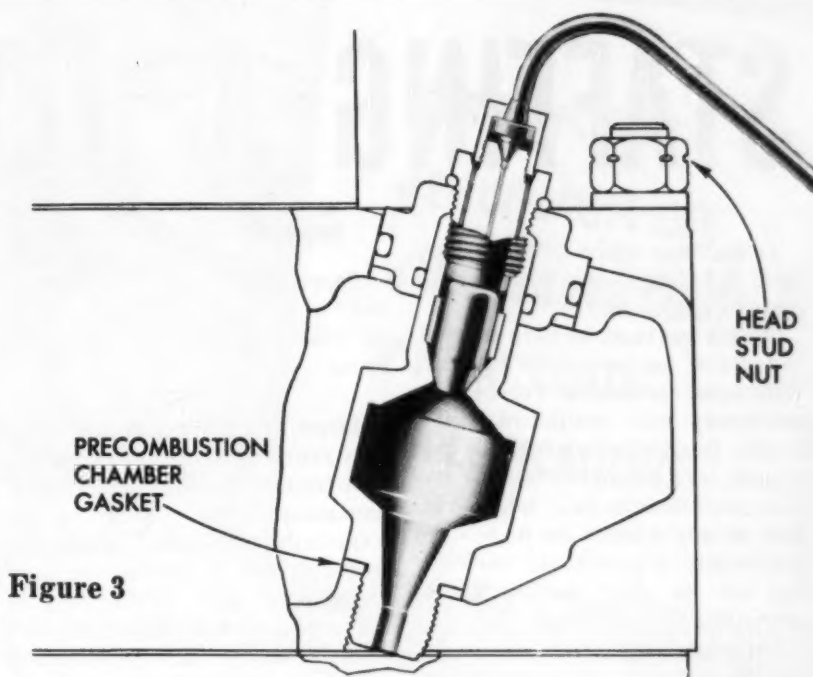


Figure 3

range indicates too great a load, while operation in the three-fourths and above range indicates too light a load is being applied to the torque converter. In either case, heat is generated by the rapid circulation of fluid. This heat must be absorbed by the cooling system.

In no case should the engine be allowed to operate at or near high idle speed with the torque converter input shaft coupled to the engine and no load on the output shaft. Overheating will probably occur in a matter of minutes. Also, with the engine operating at low idle speed and the torque converter coupled to the engine, overheating will occur, but after a much longer period of time. If the torque converter is equipped with a clutch, the clutch should always be disengaged when the engine is idled. If the torque converter is not equipped with a clutch, experience will determine how long the engine may be safely idled at low speed before overheating of the torque converter will result.

In most cases, overheating of this type can be prevented by observing the torque converter temperature gauge and, when necessary, shifting gears or readjusting the load

or engine speed to operate within the recommended limits.

Overloads on any engine for extended periods will, of course, result in slower fan speed and, eventually, overheating.

In summary, remember these important points. Most cooling systems for earthmoving machinery are basically the same. If overheating is evident, make a systematic check to determine the cause of overheating. Do not remove and discard temperature regulators — they are the "watchdogs" of the cooling system. Use clean, soft water and rust inhibitor recommended by the manufacturer. By following these recommendations, a cooling system will give the performance expected from it.

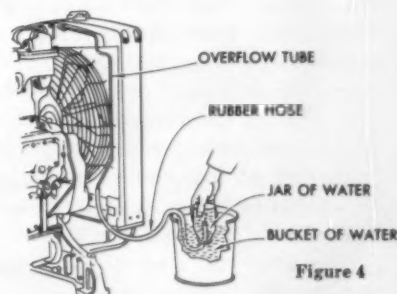


Figure 4



# STAFFING A NEW MINE

By JOHN E. OSMANSKI

*Paper presented on December 12, 1957 at the Coal Mining Institute of America Pittsburgh, Pennsylvania*

In planning a new mine we must staff it before it can become alive and workable.

With great care, we have selected the site of our new mine's portal. With equal care, we have chosen the machinery and equipment. Diligently, thoughtfully, and with the utmost of experimentation, we have predicted the daily tonnage so that we might know the mine's requirements of power, air, haulage, and all the other accessories to production.

We must, with equal care, select the people who will operate our new mine. It would be foolish to have done our job to this point so carefully and then spoil it all by the usually haphazard kind of staffing that has characterized the coal industry of the past. No longer can we line up at the driftmouth a couple of dozen likely-looking prospects and select the broad shouldered, or those who can stand without being propped, or those who can see lightning and hear thunder, or even those who have been laid off at another mine, and hope to formulate in this manner a work team that will attain the tons per man that the cost of our new equipment will demand.

Tomorrow's mine will not allow us to be so subjective and even careless in our selection and placement of its personnel. The complexity of the equipment and the difficulty of the conditions of tomorrow's mine will demand that every single man be selected scientifically to fit a special job in a well-coordinated team whose rate of work must be paced by an automated or at least, highly mechanized, work cycle. The high cost of this equipment alone will not allow us to man a new mine with a single mis-fit.

The employee who is not fitted for his job usually has plenty of

problems of his own. In addition, he is your headache, the personnel department's problem child, and management's financial luxury. He is typically, not worth his keep because of low production, a poor quality of work, or because he gets in everybody's hair. His supervisor screams about his low standard work and curses the personnel department for not knowing anything about the kind of people you need, and his fellow supervisors complain about having to put up with such a character. Can these misplacements be avoided? More specifically, is it possible to place *this worker into the right job* so that *high productivity* of a quality product at a controlled cost can be obtained?

Today there is no "yes or no" answer to this question. But, perhaps, if we can analyze the methods used today we can at least tomorrow increase our batting average in the job of staffing a new mine.

Staffing a new mine does not begin with an analysis of the abilities, adjustment potentials, status needs or personality traits of an individual worker. Staffing begins with the job. Before it is possible to secure an employee who is fitted for a job, it must be clearly known what the job requires of the employee. Staffing begins with a *description* of the job tasks and duties. When the job requirements are accurately known, it is relatively simple to specify the qualifications that will be advantageous in the performance of the job. The listing of these qualifications is the development of a *man specification* or

an employee's specification for success. To be complete, these specifications should cover the requirements of the worker in terms of: *experience* necessary to meet the job requirements; training or schooling required for satisfactory performance of the job; *physical* components of the job in terms of degrees of strength, kinds of builds, weight, height, etc. needed for the job; *age* minimums and maximums of the position, if they are significant to meeting job requirements; kinds and degrees of *personality* traits essential to success in the job; specific *skills* necessary to perform the job's duties, and *aptitudes* or learning capacities required by the job.

The more concrete and specific these factors are, the better shall be the placement of men in the jobs. These factors are usually expressed in terms of maximum and minimum, or upper and lower limits. That is, the top degree of the trait desired beyond which the worker may have too much of the trait to do well, and the bottom degree of the trait below which the worker would not succeed in the job because of having too little of the ability or trait.

Jobs are more and more being analyzed for the purpose of better selection and placement by a relatively new technique called the "*critical incident*" method. This technique depends, for its effectiveness, on identifying and defining those job activities that are characteristic of top and bottom performance of the job. By means of isolating specific incidents or job activities, man specifications can be made very concrete, realistic and divorced from the generalities or adjective traits that have plagued selection and placement for so long. That is, to say that a job

# *Compare*

... You'll see why  
you get more value in  
**CAT WHEEL TRACTORS!**

- ✓ PRODUCTION
- ✓ EQUIPMENT LIFE
- ✓ OPERATING COSTS
- ✓ FINAL COSTS
- ✓ SPECIFICATIONS



# CAT DW21

(Series C)



## Compare...

### PRODUCTION

Compare cycle time—check load weights—compare yards per hour. You'll find Cat wheel-type Tractors with matching equipment—featuring LOWBOWL Scrapers—lead the fleet! They have the right combination of power, speed, traction and loadability for fast loading, quick get-away and top haul speeds. Their ability to work season-in, season-out without losing time means maximum yardage moved at lowest cost. Operators prefer Cat units—because they're easy to handle, comfortable to operate and have good, all-around visibility. These features added together mean more production with Cat wheel Tractors!

### EQUIPMENT LIFE

Stamina for long life under the toughest conditions is built into Cat wheel Tractors. They're powered by Cat Engines, famous for lugging ability, designed and built for heavy-duty construction work. Unit construction permits easy servicing, quick replacement. Clutches with ample reserve capacity are designed and built by Caterpillar. Bearings and gears for the power train are pressure lubricated. Full-floating axles transmit power to the drive wheels and carry no weight. Here's the result of these—and many more long life design construction features: Cat units last longer, have fewer repairs, make you more money.



# CAT DW20

(Series E)



# Compare...

## OPERATING COSTS

These big, yellow earthmovers keep operating costs and maintenance at a minimum. Engine—tractor—LOWBOWL Scraper are designed for each other and built by Caterpillar to give you thousands of hours of money-making performance. Cat Engines burn low-cost No. 2 Furnace Fuel without fouling, require a minimum of service attention. We consider it our responsibility to help you get top performance and low operating costs from the entire machine.

## FINAL COSTS

Compare all these extra values you get in Cat wheel-type Tractors: extra production, longer equipment life, lower operating costs, lower cost per yard of capacity—they add up to the industry's *lowest cost per yard of dirt moved*. These prime movers have excellent production cost records the world over—they can do the same for you! We'll help you select the complete unit—tractor and full line of matched equipment—to meet your earthmoving requirements.



## Compare SPECIFICATIONS

	DW21 (Series C)	DW20 (Series E)	DW15 (Series E)
Engine, HP	300†	300†	200†
Maximum Lb. Rimpull	38,420	31,380	27,500
LOWBOWL Scraper	No. 470	No. 456	No. 428
Capacity, cu. yd.			
Struck	18	18	13
Heaped	25	25	18
Tires, Tractor (front)		14.00-24	12.00-20
Tractor (rear)		Wide-section,	Wide-section,
and Scraper		Tubeless	Tubeless
		(29.5-29)	(26.5-25)
Starting Methods	In-seat starting of either 24-volt direct electric system or independent gasoline engine.		

†Maximum Output

# CATERPILLAR\*

\*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

# Compare

Only your Caterpillar Dealer offers this complete selection of earthmoving equipment designed specifically for Caterpillar wheel Tractors. We have the undivided responsibility for the Caterpillar line as well as the other matched equipment—we have a complete line of genuine Cat-built parts and offer complete one-stop service to keep Cat earthmovers on the job.

## Compare

THE DEALER

### ORGANIZATION BEHIND CAT WHEEL TRACTORS

Caterpillar Dealers are heavy equipment specialists who understand earthmoving and are ready to help construction men select the equipment best suited for their jobs. Wherever your next job may be—whatever the equipment requirements—Caterpillar sales, parts and service are nearby. Why not have us show you how profits go up by standardizing on Caterpillar equipment!

Headquarters for  
**CATERPILLAR**  
sales • parts • service

## MATCHED EQUIPMENT



LOWBOWL Scrapers



Atley Rear Dump and Side Dump Haulers



New Atley Bottom Dump Trailer

## BECKWITH MACHINERY COMPANY

6550 HAMILTON AVENUE, PITTSBURGH, PA. • OLD TOWN ROAD, CLEARFIELD, PA. • EAST BROADWAY, FARRELL, PA.  
361-369 CONGRESS ST., BRADFORD, PA. • 1356 E. 12TH ST., ERIE, PA. • BUCKHANNON PIKE—ROUTE 20, CLARKSBURG, W. VA.

## OHIO MACHINERY CO.

6606 SCHAAF ROAD, CLEVELAND, OHIO • 930 KINNEAR ROAD, COLUMBUS, OHIO • 2807 REYNOLDS ROAD, TOLEDO, OHIO  
U. S. ROUTE 250, CADIZ, OHIO • 4000 LAKE PARK ROAD, YOUNGSTOWN, OHIO

## WALKER MACHINERY CO.

1545 HANSFORD STREET, CHARLESTON, W. VA. • 4010 EMERSON AVE., ROUTE #2, PARKERSBURG, W. VA.

CM-7

requires a high degree of initiative or a worker should have average resourcefulness is to say nothing that will assist management to place workers productively. The critical incident method instead aims at specifying those actions of a worker that denote critically his application of those traits.

Having, thus, analyzed the job and its requirements, the next step in proper staffing requires a similar analysis of the worker. Let us look at how this is done today.

Every company uses an *application blank* to start its analysis of a worker or a potential employee. The contents of these application forms vary from items about work record, schooling, to this item I saw on the application for employment in one company. "Do you read comic books?" Upon being queried about this item, the Employment Manager, with a straight face, replied, "But don't you think that a person who reads comic books will not be serious-minded on the job?"

Maybe so, maybe not. But the important thing to remember is that it is possible to determine whether *this* or any question on an application is of any value in separating satisfactory from unsatisfactory applicants. The principle involved here is that of determining how satisfactory employees now on the job have responded to the same item. By a statistical analyses it is possible to determine whether or not responses to a given item on the application differentiate workers on the job who are satisfactory from those who are not satisfactory. If an item separates the sheep from the goats among those already employed, it can be expected to do so with applicants.

By use of the same principle, other currently used placement devices can be or should be validated. *Transcripts, medical examinations, and tests* — all used in most industries today for selection and placement purposes — must be subjected to this same validation process to be truly effective.

The *interview* used in conjunc-



Left: Edw. G. Fox, Bituminous Coal Operators Assn.; W. E. Hess, Gen. Supt., Jones & Laughlin Steel Corp. mines; Dick Johnson, Mine Safety Appliances Co.



Left: Ralph Spindler, Dir. School Mines, West Virginia University; J. Allen Brookes, Gen. Mgr. Mines, Pickand, Mather Co.; Geo. Lockwood, Pickands, Mather Co.; Henry Rose, Pres. Pittsburgh Coal Co.



Left to right: J. M. Lowe, Secretary and Treasurer, G. A. Shoemaker, Exec.-V-Pres., Pittsburgh Consolidation Coal Co.; James R. Reilly, V-Pres., Hanna Coal Co.; M. D. Cooper, Director Mining Education, National Coal Ass'n.



tion with the application blank is undoubtedly the most common method of staffing a mine — yet, it is probably the method that has resulted in the greatest misplacement of personnel. It has been shown, for example, that the interview frequently results in inaccurate information about the applicant, that even presumably equally competent interviewers frequently disagree in their judgement of applicants and that individual interviewers frequently are unduly influenced by their own prejudices and biases about such factors as personal appearance or personality traits of workers or applicants. Despite such shortcomings, however, it serves certain useful purposes in selection and placement.

Improvements in *this* selection device are being made. These developments or improvements to interviewing have been along four lines:

- 1) Development of the standardized or pattern interview in which the interviewer asks a set of standard questions.
- 2) Use of multiple interviews — that is, having the worker interviewed by several people, later correlating judgements and ratings.
- 3) More adequate training of interviewers.

4) A combination of the pattern interview and a rating such as the Diagnostic Interviewers Guide.

Such man specifications as intelligence, skills, aptitudes, and personality traits are usually analyzed by means of *tests*. Of course, it is obvious that measurements here are not made with the same precision with which it is possible to measure the diameter of a cylinder, the weight of a bag of flour, or the temperature of a kettle of liquid. However, when tests are tested that is when they are subjected to the same analysis as items on an application form, they can yield very satisfactory results, serving in conjunction with other data as adequate indices of performance potential.

Of course, a very revealing staffing device is the worker's *work record*. How has he done in his several jobs? If he is a new employee, what do his former employers say about him? Reference checks of new employees or candidates for work are not as useless as we are at first inclined to think. Recent research has shown that the use of specific questions on a "past employment reference inquiry" subjected to validation, like a test can yield significant data

for good selection and proper placement. *Ratings* by supervisors of workers to be transferred, promoted, or otherwise relocated are only as useful as the ratings themselves are objective, reliable and valid.

These, too, must be subjected to validations before we can use them effectively. A word of caution in the use of even good work records, it cannot be assumed that because a man has good work record in one job or in one company or in one department or under one supervisor, he will, therefore, be a good employee in another job or another department. Work records like tests or references or any one of these several staffing devices must also be checked by each of the other devices to be truly valid and meaningful. These then, are the current techniques for staffing a mine.

No one is good by itself. Even in combination, they leave much to be desired. We have today no sure-fire method of selecting and placing workers to ensure a 1000 per cent batting average. These devices, from job description to work record, used to compliment each other, can however, increase the number of "hits" and decrease the errors in selection and placement.

Furthermore, these are, with only minor modifications, the only

## Seen At Open Pit Mining



Left: Ed Donahue, Allegheny Machinery Sales Co.; Thad. Wayne, Dick Thomas, Lewis Stein, all of the Elliot Coal Mining Co.; J. Haveman, Link-Belt Co.

Left: J. J. Janssen, Sales Mgr., Highway Equipment Co.; L. Auchenbaugh, Auchenbaugh Coal Co.; F. H. Mohny, Vice-Pres., Independent Mineral Producers Assn.; W. R. Cunningham, Deputy Secretary, Penna. Dept. Mines. Sitting is Jack Daugherty Jr., Highway Equipment Co.

devices today known to select and place workers in any situations whether it be a new employee, a promotion, a transfer or any other relocation of the work force. The strengths and weaknesses of each device appear uniformly in whatever use they are put. Fortunately, the most accurate of these devices measures the one factor that, if possessed by a worker, can ensure success in the performance of his job; that is learning capacity. Measures of learning capacity or intelligence are our most valid, reliable, or true and consistent selection instruments. This is fortunate because no selection and placement technique will eliminate the need for training on the job.

If a worker possesses the required learning capacity, it is then possible to train him to be the productive, adjusted, and satisfied worker we want him to be. This is a function that only operating management can perform satisfactorily. Yes, elaborate personnel departments replete with training directors and conference leaders are the current rage in today's industry. But only the operating supervisor can isolate the realistic needs for training.

Management training, job rotation or loop courses, executive de-

velopment supervisory conferences, seminars and institutes like this one—all the techniques of training the new worker, whether he be a cutter operator or a mine superintendent are only as good as the need for them is specific, clearly defined and objectively determined. The job of developing tomorrow's workers and tomorrow's managers is both too big and too important to be considered a special activity relegated to a specific department like the personnel department or the training section. The organization of a man's job, his relationship to his supervisor and his subordinates, the spirit of the organization itself and the corporate structure—all the factors pertinent to the development of an atmosphere of learning, merge together to affect the success or failures of the program of personnel development.

Specialized training programs as are conducted by personnel departments or foreman's clubs can only be a supplement—a necessary supplement, but only a supplement, to the basic development or training process. *This development process must be self-development. For training or development is always self-development.* Nothing could be more absurd than for an enterprise to assume responsibility for

the development of a worker. The responsibility rests with the individual, his abilities, his efforts. No business enterprise is competent, let alone obligated, to substitute its efforts for the self-development of the individual. To do this would not only be unwarranted paternalism, it would be foolish pretension.

Supervisors of tomorrow's mine will have the opportunity to encourage self-development or to stifle it; to direct it or to misdirect it. Mine management should be now, and certainly will be some years hence, specifically assigned the responsibility of helping all miners to focus, direct, and apply their self-development efforts productively. Every company can provide systematic development challenges to its workers.

The first job is an individual one. Supervisors should think through what each man is capable of doing. The basis for this is, of course, the systematic appraisal of men by all the techniques mentioned in the staffing process. Supervisors must then ask themselves two questions:

- 1) Is the man placed in the job where he can make the greatest contribution to the company?
- 2) What does he have to learn, what weaknesses does he have to

## Assn. Picnic Last Summer



Left: Paul James, John Roebeling Sons; Robert D. Jones, Putnam Green Co.; J. K. Kovalik and Ed Boron, Boron Coal Co.

Left: J. M. Pugh, Anderson Equipment Co.; Walter Colder, Beckwith Machinery Co.; R. G. Kuhns, John Teeter, Bill Phillips of the Teeter Coal Co.; John Miller, Ester Coal Sales Co.; John Teeter, Teeter Coal Co.

overcome to be able to realize fully his strength and capacities?

Answers to these questions decide what specific action must be taken to promote, to motivate self-development. It may be a move to another job, it may be a specific project assignment, it may be attendance at a conference, or it may be a study of a proposed new method of operation.

Such opportunities almost always exist in every business and in tomorrow's mine, we must grasp every opportunity for this kind of training. We shall not be able to find in the labor market the man who has had sufficient experience with tomorrow's operations to be effective without this kind of training.

There are two forces that are active in the coal industry today that are making it necessary for mine management to develop men after they have been hired; to train the men who staff the new mine in the dynamics of the new organization and the techniques of the new mechanization. These two forces are decentralization and automation.

It is difficult to discuss one of these factors without mentioning the other. They are interdependent and woven tightly together. Automation is forcing decentralization and decentralization is demanding the new technology. I trust that you will see the relationship even as I try to examine each separately.

The popular belief that automation will replace human labor by robots is utterly false. In reality, the new technology will employ more people and, above all, more people who are highly skilled and highly trained. Of course, there will be major displacement problems and important changes will take place in the mining employment pattern. Already, according to Dr. Norbert Weiner of M. I. T. "in all important respects the man who has nothing but his physical power to sell has nothing to sell which is worth anyone's money to buy." The time is nearing when the

man who has only simple judgment to offer, the ability to pull switches, to turn valves, or to inspect flaws won't find any buyers either.

The push-button mine of tomorrow will not be a vast expanse of workerless machines. The Oak Ridge Atomic Plant, for example, is highly automated, yet is staffed by hundred of skilled maintenance workers and supervisors. Many of today's electricians will have to learn electronics. Pipefitters may have to learn hydraulics — There may be almost no place left for the unskilled mine worker.

Yet, the problem will not be one of unemployment. It is estimated that by 1964 the greatest shortage in the U. S. will be manpower. 184 million Americans by 1964 will want 40% more goods than we consume today and will demand 100% more electrical products. Yet, the work force available then will be only about 13% more than we have now. Technological changes will not make human labor superfluous. No, the major problem will be the training and re-training of the present labor force to perform the necessary designing, producing, and maintaining of the new tools.

Futhermore, the new technology will require many more men of management. Many men now considered rank and file will have to become capable of doing mine management work. The great majority of technicians will have to be able to understand what management is, to see and think managerially. And, the new technology will demand the utmost in decentralization, in flexibility and in management autonomy. Under automation, any enterprise that attempts to centralize responsibility and decision making at the top will perish.

Decentralization, an organizational structure which groups activities into autonomous product businesses each with its own market, its own product, its own profit and loss responsibilities is rapidly taking hold in American business. This is the trend of organizational structure that will eliminate large

central headquarters staffs like personnel and training departments and replace them with operating supervisors who can utilize all the opportunities for self-development of workers that exist in the company for the creation of tomorrow's effective work force.

Mine management's major task will not be the coaching of assistants or helpers, or the teaching by example and demonstration of workers as you were instructed to do under JIT programs or personnel department sponsored training programs. With a completely decentralized enterprise, each section, mine, or shop will become an integral profit unit of its own and the supervisors's job especially when the new technology takes over, will be the isolation of worker's weaknesses and the provisions of challenges or opportunities for each worker to make his own decisions and, thus, to develop himself.

Because under automation the worker will not do the repetitive chores of materials handling, but instead, the controlling of the machines which do the routine work. Because of this — tomorrow's worker must be able to do many operations, must be able to coordinate them, and to plan them. To maintain tomorrow's equipment, to program it, to set it, and to control it all demand of the worker in the new technology knowledge, responsibility and decision making — this is planning. The problem then will be how to train today's workers to be able to do even more planning than a good many people who call themselves managers today are capable of doing. The common training tools of today will not do.

The back-up man kind of training we all use today will not provide the kind of decision makers all workers of tomorrow will have to be. Work as a lieutenant or assistant does not adequately prepare a man for the pressures of making his own decisions. On the contrary, nothing is more common than the trusted and effective help-



er who collapses when he is put on his own. Furthermore, the job rotation is not enough either. Job rotation usually takes one of two forms..

A man who has come up as a specialist in one function is put into another function for a short while — often into several functions, one after another. Or a man is put into a special training job since he does not know enough about any other function to carry a regular job in it. This is not enough because what business tomorrow will need is not an electrician who knows a smattering of hydraulics or an engineer who knows the terminology of the accountant. Tomorrow's decentralized, automated mine will need men in all areas who know the overall business.

Training today for tomorrow's mine must aim at challenging all to growth and self-development through allowing today's workers to perform, not just to practise, but really to perform the actual job of planning and making decisions. Your job will be the selection and placement of these workers into jobs where their planning can yield the greatest productivity from the machines. Your job will be the motivation of these workers to self-development by the provisions of an atmosphere of challenges or opportunity to learn.

The new mine, the decentralized, automated mine of tomorrow can only be staffed by men who develop today. Consequently, the success of the new mine will be only as great as you are careful today to select and place workers in jobs that fit them and jobs into which they fit and in jobs that challenge them to learn the new skills that will be needed in the new mine we have described here today.

C. D. McDowell has been elected secretary - treasurer. Mr. McDowell has been with the Harlan Association for the past six years as assistant secretary.



A new line of M-S-A gloves made of five molded materials including two types of natural rubber, Buna-N synthetic rubber, Neoprene, and Compar Plastic having highest resistance to oils and solvents, is announced by Mine Safety Appliance Company, Pittsburgh.

A full range of sizes, weights, and lengths (10½ to 18 inches) with smooth, Firmhold, or Reinforced Firmhold finishes are stocked, as well as finger cots of latex and neoprene. A guide in selecting glove material that best resists any of the many oils, solvents, and chemicals that are commonly used in industrial plants is also offered by Mine Safety Appliances Company.

The new line greatly expands the MSA line of safety gloves which includes specially impregnated fabrics, leather, asbestos, combinations of these materials and other special protectors for hands and fingers.

## CUT MAINTENANCE COSTS! SAVE DOWN TIME! on your Hydraulic System

Keep it clean with

### SCHROEDER LINE FILTERS



The Schroeder Line Filter is the answer to keeping harmful dirt from slowing down the operation of your hydraulic equipment. This small, all-in-one unit has a large filtering capacity and removes damaging particles too small to be seen.

#### Here's why **SCHROEDER LINE FILTERS** are preferred:

- Filter element costs little and is replaceable.
- Flip-top cap permits minute change of element.
- Designed for space-saving installation.
- Many types and makes of filter elements available.
- Minimum cost for maximum filtration area.
- Element protected by built-in bypass relief.
- Built-in orifice for partial filtration available.
- Working pressures conservatively rated—each unit shop-tested.

Optional Spin-Dicator provides visual supervision of performance.

### SCHROEDER BROTHERS

CORPORATION

NICHOL AVE., BOX 72, McKEES ROCKS, PA.  
(Pittsburgh District)

Hydraulic, Electric and Pneumatic Equipment

— REDUCE WEAR AND DOWN TIME... Install SCHROEDER LINE FILTERS —



This youthful Dutch coal miner believes his M-S-A Dustfoe is one of the most important items supplied to workers at the big Domaniale Mine, where he is one of 2,000 men who work underground. The lightweight, comfortable Dustfoe shields him from nuisance, toxic and fibrosis-producing dusts and other irritants which are indigenous to coal mines.



Coal miners at the Domaniale Mine, Netherlands, turn-in their Dustfoes after each work-shift. After the Dustfoes are cleaned and sterilized, they are placed on racks such as this, for ease of distribution. This system has resulted in overwhelming worker acceptance of the respirators.

## Respirators Protect Miners' Health

- A highly efficient program of respirator service and maintenance at the Domaniale Coal Mine, Kerkraade, Netherlands, has produced significant results in protection of miners against the hazards of dust inhalation.

Officials of the big mine, which employs 2,000 persons underground and 900 above the surface, believe a respirator program must have complete worker acceptance to be effective.

Several years ago, most of the miners rejected respirators as "too heavy" or "uncomfortable."

After a thorough study of the problem, Domaniale Mine officials decided to switch to the lightweight and comfortable M-S-A Dustfoe, and to establish a comprehensive system of cleaning and maintaining the respirators.

Each Dustfoe is marked with the number of the employee who uses it, and no exchanging is permitted. At the conclusion of each shift, miners turn in their Dustfoe at a conveniently located central processing station. There, the units are carefully cleaned and sterilized.

The body, filterfork and facepiece cushion of each Dustfoe are washed in lukewarm soapy water and sterilized. The body and fork are then dried in a specially-designed heated cabinet, but the facepiece is permitted to dry in open air.

Some miners use as many as one filter per week, while most of them working in less dusty areas



This "laundry" is unlike any other laundry. It is operated by the Domaniale Mine, Netherlands, for cleaning, drying and sterilizing Dustfoe respirators used in the mine. Workers employed in the laundry are all victims of Silicosis. Domaniale officials hope that, with the continued cooperation of the miners in using equipment such as Dustfoe, Silicosis will not strike any present or future employees.

use the same filter for a longer time.

Domaniale Mining Company, which produces about 500,000 tons of coal a year, was established in 1925. It has an area of 1,700 acres.

The Dustfoe, manufactured by Mine Safety Appliances Company, Pittsburgh, Pennsylvania, consists of an aluminum facepiece which can be easily formed to fit the contour of the wearer's face, for maximum comfort.

The facepiece cushion is made of a neoprene sponge material which forms an airtight seal with minimum adjustment and maximum comfort. This soft, pliable material does not harden with age.

Total weight of the Dustfoe model generally used in the Domaniale Mine is 4½ ounces. Several other Dustfoe models also are available. All models will protect the wearer from inhaling nuisance dusts and fibrosis-producing dusts.

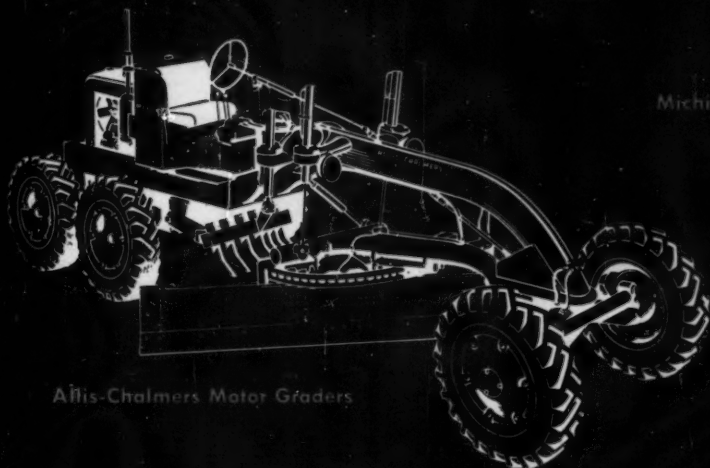
"We have a number of employees who now work in non-mining capacities because they are victims of Silicosis, contracted in the days when health and safety equipment was not available. We hope that, with the continued cooperation of the miners in using equipment such as the Dustfoe, this dreaded ailment will not strike any of our present or future employees," a mine official said.

This Dutch coal miner is turning-in his M-S-A Dustfoe Respirator at the end of his workday. The respirator will be washed, sterilized, and ready for use when he returns to work.

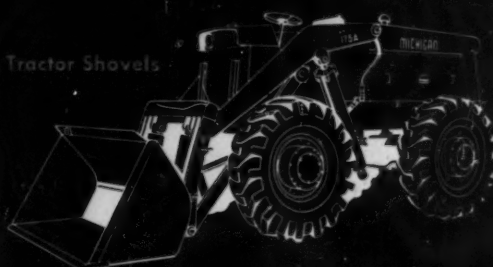


For the best in all types of mining  
equipment...

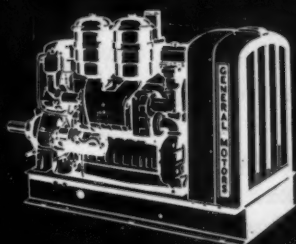
SEE *Highway* FIRST!



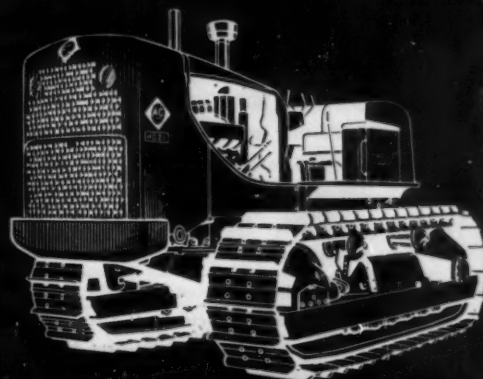
Allis-Chalmers Motor Graders



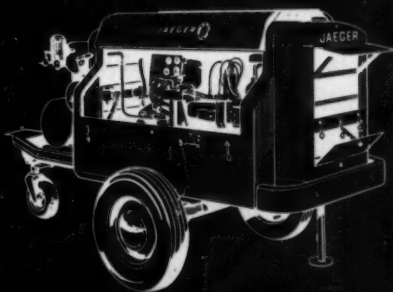
Michigan Tractor Shovels



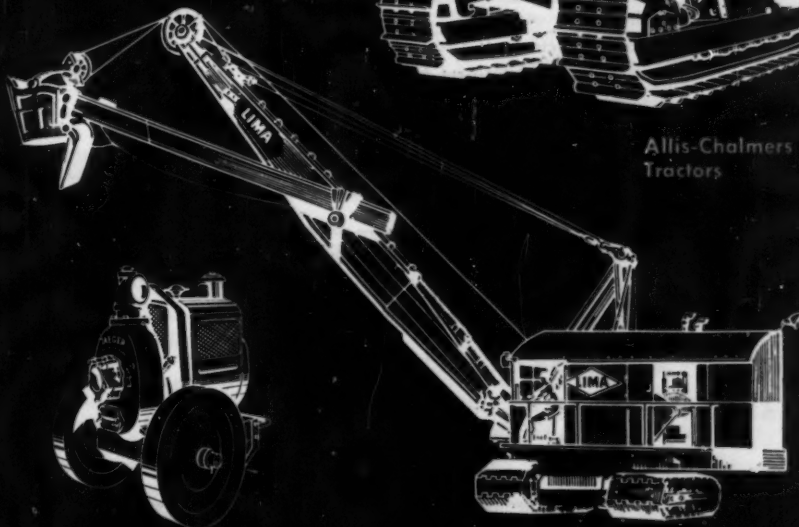
General Motors  
Diesel Engines



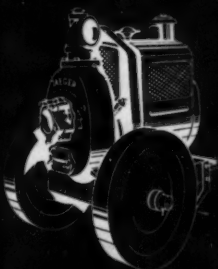
Allis-Chalmers  
Tractors



Jaeger  
Compressors



Lima Shovels, Cranes, Draglines



Jaeger Pumps

*Highway*

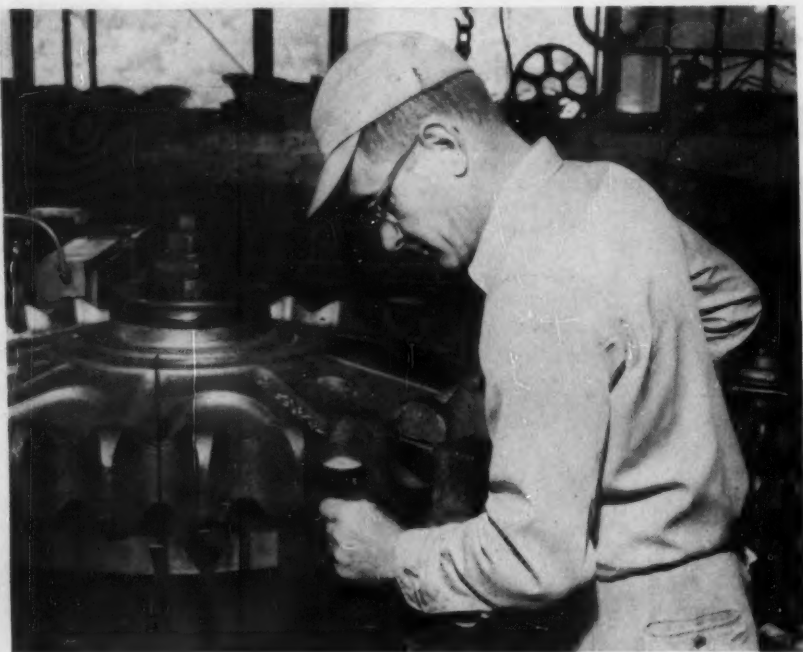
**EQUIPMENT COMPANY**

6465 Hamilton Ave. • Pittsburgh, Pa.

ALLIS-CHALMERS • MASTER • JAEGER  
LIMA SHOVELS, CRANES, DRAGLINES  
POWER-PACK CONVEYORS  
GENERAL MOTORS DIESEL ENGINES  
BURMEISTER MIXERS AND BINS  
LIMA ROADPACKERS • GAR WOOD  
MICHIGAN TRACTOR SHOVELS  
AND EXCAVATOR-CRANES • THOR







An innovation in modern metallurgy promises good news to owners of earthmoving equipment. Setting an industry precedent, the element boron is being used to measurably increase the life of crawler tractor sprockets.

Marketed under the trade name Boralloy, these sprockets are now standard equipment on Caterpillar D8 and D9 Tractors. Boralloy replacement rims are available for D8 sprockets.

Representing the first commercially successful attempt to produce boron-bearing cast carbon steel by the acid open hearth process, the Boralloy sprocket was developed as a cooperative research project between Caterpillar Tractor Co., Peoria, Ill., and Harrison Steel Castings Company, Attica, Indiana.

Designed for greater efficiency and economy in mine rock dusting operations is the new M-S-A Self-Propelled Bantam 400 Rock Dust Distributor, manufactured by Mine Safety Appliances Company, Pittsburgh.

A compact unit with a deck load capacity of 800 pounds of rock dust, the Bantam 400 is especially adapted to continuous mining techniques. It moves into position with its maximum supply of dust from the last open breakthrough to permit immediate application of dust up to the face and into return airways — either on or between shifts.

With an M-S-A Wetdust nozzle attached to the Bantam 400's discharge hose, wet rock dusting can be accomplished "on shift" to prevent interruption of the mining cycle.

While one man can handle conventional dusting requirements with 50 feet of hose, a two man team can utilize 400 feet of hose in dusting air courses as far as the Bantam's power supply cable will permit. In the latter instance, one man feeds dust into the distributor hopper as the other applies it with the hose.

The self-propelled Bantam 400 travels at a tram speed of  $1\frac{1}{2}$  miles per hour and can discharge rock dust through 400 feet of two-inch hose at an average rate of 30 pounds a minute — or at more than 100 pounds a minute through 25 feet.

A minimum height of 27 inches with 80-pound capacity stainless steel hoppers, or 31 inches with 160 pound capacity hoppers, makes Bantam low enough for effective use and maneuverability in low coal seams.

The new M-S-A Self-Propelled Bantam 400 Rock Dust Distributor — 250 and 550 volt D.C., with 25 feet of power cable — is available from Mine Safety Appliances Company, Pittsburgh.



**JEFFREY CHAINS  
and SPROCKETS**

**DIAMOND ROLLER CHAINS**

**MAC WHYTE  
WIRE ROPE**

**BRAKE  
LINING**

**NORTHEASTERN SUPPLY CO.**

321 CHERRY AVE., N. E.

CANTON, O.

ALSO BRANCH ZANESVILLE SUPPLY CO.  
ZANESVILLE, O.



• Robert P. Brooks has been promoted to assistant sales manager, large machines and blast hole drills, effective July 15, according to an announcement from Bucyrus-Erie Co., South Milwaukee, Wis. Brooks, formerly Northwestern Sales Manager at Seattle, Wash., since 1954, will now work out of the South Milwaukee office.

Brooks graduated from Pennsylvania State University in 1942 with a degree in mining engineering. He spent the next four years in the U. S. Army, rising from the rank of lieutenant to captain in the U. S. Engineers. In 1946, he joined Bucyrus-Erie under a special apprenticeship. Later he was assigned to Seattle as a small shovel sales representative. He held this position until his promotion in 1954, except for a two-year leave of absence when recalled to active military duty as an operations and training school officer at Sixth Army Headquarters during the Korean War.

• Howard B. Jones has joined the Long Company, Oak Hill, W. Va., manufacturers of mining equipment and conveying machinery, as sales representative for Northern West Virginia and Western and Central Pennsylvania. The announcement was made by Robert C. Nelson, vice president in charge of sales for Long.

Jones, who will have his headquarters in Morgantown, W. Va.,

was formerly employed by National Mine Service Company in a sales capacity.

A native of Fairmont, W. Va., Jones attended schools in Fairmont and studied electrical engineering with I. C. S. He has had 12 years mechanical and electrical maintenance experience in coal mines with Eastern Gas and Fuel Associates, Grant Town, W. Va., and Pittsburgh Consolidation Coal Company, Monongah, W. Va., and also completed a course in coal mining presented by West Virginia University.

• Crucible Steel Company of America today announced the acquisition of rights to more than 15,000 surface acres of additional coal reserves.

The acreage located at Hugheston, W. Va., on the Kanawha River, is expected to yield in excess of 20 million tons of Number Two Gas Seam high volatile metallurgical coal.

#### WANTED

1201 Lima Dragline  
Good condition — Low price  
**FRANK SWABB EQUIPMENT CO., INC.**  
313 Hazleton Nat'l Bank Bldg.  
Hazleton, Pa. GLadstone 5-3658

#### FOR SALE

Manitowoc 4500—5 yd. Dragline, A-1.  
Manitowoc 3000—1½ yd. good condition  
Osgood 800 Shovel, 1½ yd., good condition.

Lot	{	Marion 40A Drag, 3 yd. — P18955, 2 yd. — D8 Dozer and D7 Dozer, all in good operating condition.
Lot	{	Joy 8 BU — GE 8 ton — Goodman Cutter — Jeffrey 35 B Cutter — 100 MG Set — 42" ga. D-B Mine Cars, 5 ton.

Goodman 512 Cutters with 10' bars.  
GE 30 Locomotive, 42-44 ga., like new.  
Joy Miner 3JCM 4CE, ready to work.  
Compton Hy Wall Auger, 48" or 42", complete.  
500 H.P. Mine Slope Hoist, complete.  
Compton Hy Wall Auger, 30" or 42", complete.  
500 KW — MG Set — 2300 A.C. — 250v. D.C.  
Small Deep Mine 500TPD Pgh. Coal Seam.

#### T. L. SIMPSON

MACHINERY AGENT  
1200 Woodbourne Ave. Pittsburgh 26, Pa.  
Phone LEhigh 1-2254

**Save on Your  
INDUSTRIAL  
TRACK**

**FOSTER**

QUALITY

**RELAYING RAILS**

**FULLY  
GUARANTEED**

Handle more cars better—cost less to install and maintain. Foster stocks all Rail Sections 12# thru 175#, Switch Material and Track Accessories.

SEND FOR CATALOGS

**RAILS - TRACK EQUIPMENT - PIPE - PILING**

**L.B. FOSTER CO.**

PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4  
ATLANTA 8 • HOUSTON 2 • LOS ANGELES 5

#### FOR SALE

**EUCLID TRUCKS**—Rear, Bottom Dumps and Scrapers  
**SHOVELS, DRAGLINES** — All sizes, makes. Crawler and walking type, diesel and electric powered.  
**120B BUCYRUS ERIE**—Electric shovel, 6 yd.  
**WELL DRILLS**—Rotary and Churn type.  
**TRUCK CRANES, CRAWLER CRANES**  
**DOZERS** — FRONT END LOADERS and GRADERS  
**CATERPILLAR MOTOR SCRAPERS**—DW21  
"Other Equipment available not listed above."

#### WILLIAM LUBRECHT, III

Construction Equipment  
311 W. Diamond Ave. Hazleton, Pa.  
Gladstone 5-4041 — 5-0253

#### GOOD USED COAL STRIPPING EQUIPMENT

625 Page Diesel Drag, 150', 10 yd.  
621-S Page Diesel Drag, 135', 6 yd.  
2400 Lima Drag, 120', 6 yd.  
4500 Manitowoc Drag, 120', 5½ yd.  
5-W Bucyrus Erie Drag, 120', 5 yd.  
111-M Marion Drag, 100', 4 yd.  
1055 P & H Drag, 100', 3½ yd.  
K-595 Link Belt Drag, 85', 3 yd.  
54-B Bucyrus Erie Drag, 80', 2½ yd.  
802 Lima Comb. H. L. Shovel and Dragline  
170-B Bucyrus Erie 4½ yd. Elec. Shovel  
120-B Bucyrus 4 yd. Electric Shovel  
1201 Lima 2½ yd. H. L. Shovel  
54-B Bucyrus Erie 2½ yd. Standard Shovel  
3500 Manitowoc 2 yd. H. L. Shovel  
K-370 Link Belt 1½ yd. H. L. Shovel  
Unit 1929 ¾ yard Shovel  
Also, various smaller Shovels and Drags  
400 Reich Truck Mounted Rotary Air Drill  
600 Reich Heavy Truck Mounted Rotary Air Drill  
McCarthy Coal Auger Recovery Drill  
Euclid Trucks — Rear and Bottom dump  
Caterpillar & International Dozers  
Garwood, Allis-Chalmers & Euclid Scrapers  
Front End Loaders

#### FRANK SWABB Equipment Co., Inc.

313 Hazleton Nat'l Bank Bldg.  
Hazleton, Pa., GLadstone 5-3658

It Pays to Advertise in Coal Mining

# CUSTOMERS WANTED!

## NO EXPERIENCE NECESSARY!

Let us Show You How to Make MONEY by Taking Advantage of the BEST Bargains ever in Mining Equipment. Largest Stock Anywhere.

WE OWN WHAT WE ADVERTISE!

### JOY EQUIPMENT—REBUILT

- 1—Joy 8AE Super 14BU Loader, rebuilt.
- 3—Joy 14-BU Loaders, low pedestal, 7AE.
- 2—Joy 14 BU Loaders, medium pedestal, 7BBE.
- 1—Joy 14-BU Loader, high pedestal, 7BE.
- 2—Joy 12-BU Loaders, 9E, latest type.
- 1—Joy 20-BU Loader, latest type.
- 1—Joy 11-BU Loader, latest type.
- 2—Joy 8-BU Loaders, 250 volt DC.
- 1—Joy 6-BU Loader, 34" overall height.
- 2—Joy 8-BU Loaders, 220 volt AC.
- 2—Joy curved Bar Heads, complete.
- 3—Reliance 38-J Motors, 10 H.P.
- 6—Reliance 24-J Motors, 7½ H.P.
- 5—Reliance 16-J Motors, 5 H.P.
- 20—5-J Motors, 4 H.P.
- 6—New Wheel Units for Joy 6 SC Shuttle Cars.
- 1—Goodman 660 Loader on cats, excellent.
- 3—Goodman 645 Loaders on cats, latest type.
- 2—8SC Shuttle Cars, latest, low vein.
- 2—Joy 6 SC Shuttle Cars, rebuilt.
- 1—Joy 5 SC Shuttle Car, rebuilt.
- 2—Joy 32E9 Shuttle Cars.
- 2—Joy 32E10 Shuttle Cars, rebuilt.
- 2—Joy 32E15 Shuttle Cars, rebuilt.
- 1—Joy 32E16 Shuttle Car, rebuilt.
- 2—Joy 42E16 Shuttle Cars, rebuilt.
- 1—Joy T-2-5 low pan Cat Truck.
- 2—Joy T-2-6 low pan Cat Trucks with reel.
- 1—Joy T-1 Standard Cat Trucks, 220 AC.
- 1—Joy T-1 Standard Cat Truck, 220 DC.
- 2—Joy 11-B Cutting Machines, like new.
- 1—Joy 7-B Cutting Machine, like new.
- 3—Joy CD-22 Drills, like new.
- 2—Goodman 512 Machines, with Bugdusters.
- 1—Goodman Machine on Cats, 31" high. All hydraulic.
- 1—Goodman 512 cutting machine, perfect.
- 2—Goodman 512 cutting machines, 220 volt A.C.
- 1—LeeNorne low vein Machine Carrier on rubber.
- 2—Jeffrey 70 URB's, rubber-tired Cutters, Universal head, perfect condition.
- 1—Joy 11RU, rubber-tired Cutter with bugdusters, Universal head and dual tires.
- 3—Jeffrey 29UC Cutting Machines, Universal head, cuts anywhere in seam, 35" high, on cats, 250 volt DC.

### LOCOMOTIVES

- 2—Jeffrey MH-215A's, 15 tons, perfect, 42" Ga.
- 2—Jeffrey 13 ton, type MH-110, 36", 42" and 44" Ga.
- 2—Jeffrey 10 ton, type MH-110, 42" and 44" Ga.
- 1—150 K.W. 6 phase, A.C. Rotary Converter, 275 V.
- 12—Jeffrey, 6 ton, type MH-88, 42", 44" and 48" Ga.
- 8—Jeffrey MH-78 Locomotive Units, cheap.
- 4—Jeffrey MH-88 Locomotive Units, real Bargains.
- 6—Jeffrey MH-100 Locomotive Units, reasonable.
- 2—Jeffrey, 8 ton, type MH-100, 2" armor plate frames.
- 1—Jeffrey, 6 ton, type 2186, 22" above rail.
- 3—Jeffrey, 4 ton, type MH-96, 42", 44" and 48" Ga.
- 1—G. E., 4 ton, type 825 Locomotive, 22" high.
- 10—G. E., 6 ton, types 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
- 1—G. E., 8 ton, type 822 Locomotive, 44" Ga.
- 3—G. E., 10 ton, type 803 Locomotive, 42", 44" and 48" Ga.
- 1—Goodman, 4 ton, 8-30 Locomotive, 22" above rail.
- 2—Goodman, type 33, 6 ton, 44" and 48" Ga.
- 3—Goodman, 8 ton, type 22A, 36", 44" and 48" Ga.
- 3—Westinghouse, type 902, 4 ton, 42" and 48" Ga.
- 2—Westinghouse, type 904, 6 ton, 44" and 48" Ga.
- 2—Westinghouse, type 906, 44" and 48" Ga.

### LOCOMOTIVES (Cont.)

- 2—Westinghouse, type 907, 10 ton, 44" and 48" Ga.
- 2—Diesel Locomotives, 8 and 10 tons, Excellent. Locomotive Trucks and Spare Armatures for all the above.

### TIPPLE EQUIPMENT

- 1—Cedar Rapids portable super Screening Plant.
- 1—Allis Chalmers 5'x14' Rippflo Vibrator.
- 1—5'x14' Robins double deck Vibrator.
- 1—4'x10' Robins Gyrex Vibrator.
- 1—McNally Pittsburg all steel Tipple, four track, perfect.
- 1—Complete five track tipple, all steel, with two compartment Jeffrey Washer.
- 1—Menzies tandem Hydro-Separator.
- 1—Robins Car Shakeout.
- 1—Crushers, various sizes.
- Feeders, Drag Conveyors and Loading Booms.

### CUTTING MACHINES

- 2—Jeffrey 70URB Cutters, rubber-tired, Universal Head, low vein.
- 2—Jeffrey 29UC Universal Machines on Cats.
- 1—Joy rubber-tired 11RU Cutter with bugdusters.
- 1—Goodman on Cats, 31" overall height.
- 1—Baby Goodman 212, rebuilt, 250 volt D. C.
- 1—Baby Goodman 212, rebuilt, 220 volt, 3 phase AC.
- 1—Goodman 312, 18" high.
- 2—Goodman 512's with Bugdusters, like new.
- 4—Goodman 512's, rebuilt, or as removed from service.
- 2—Joy 11B Cutting Machines, rebuilt.
- 2—Goodman 512 Cutting Machines, 220 volt A. C.
- 2—Goodman 12AA's and 112AA's.
- 2—Goodman 324 Slabbers.
- 2—Goodman 724 Slabbers.
- 6—Jeffrey 35L's, like new, 17" high.
- 2—Jeffrey 35L's, on low vein trucks.
- 15—Jeffrey 35B's and 35BB's.
- 2—Jeffrey 29B's on track.
- 2—Jeffrey 29C's track mounted.
- 1—Jeffrey 29L on track, perfect.
- 2—Sullivan CR-10's, 15 high.

### LOADING MACHINES

- 16—Loaders, all types.
- 2—Jeffrey 61 CIR's on rubber, 26".
- 3—Jeffrey L-500 Loaders.
- 2—Myers Whaley No. 3 Automat Loaders.
- 2—Clarkson Loaders, 26" above rail.

### CONVEYORS

- 2—Jeffrey 52-B, 30" Conveyors, 1500' each. Excellent.
- 4—Joy 30" Underground Belt Conveyors, 500' to 2000' each. Excellent.
- 1—Barber Greene 30" Belt Conveyor, 1000'. Excellent.
- 1—Robins 30" Belt Conveyor, 1000'.
- 2—Jeffrey 52-B, 26" Conveyors, 1200' each.
- 3000' Conveyor Belt, 30".
- 2—61EW Elevating Conveyors
- 2—61WH 15" Room Conveyors, 300 ft.
- 2—Joy 15" Room Conveyors, 300'.
- 4—Joy Ladel UN—18 Shakers.
- 10—Goodman G-12½ and G-15 Shakers.
- 3—Long 400 DBH 15" Chain Conveyors, 25 H.P. Motors, new.

### CONVERTERS AND DIESEL PLANTS

- 1—50KW G. E. TC-6, 275 volt Rotary Converter.
- 2—100KW, G. E. TCC-6's, 275 volt, Rotary Converters.
- 1—150KW, G. E. HCC-6, 275 volt, Rotary Converter.
- 1—150KW, 6 phase, Allis Chalmers Rotary Converter, 275 volt DC, perfect.

### Converters and Diesel Plants (Cont.)

- 1—200KW, G. E. HCC-6 Rotary Converter, 275 volt DC.
- 2—300KW, G. E. HCC-6 Rotary Converters, 275 DC.
- 3—300KW Westinghouse, 6 phase, Rotary Converters, 275 volt DC.
- 1—375KW Westinghouse Rotary Converter, 275 volt.
- 2—500KW Westinghouse Rotary Converters, 275 volt DC.
- 1—230KW Westinghouse Rotary Converter, 275 DC.
- 1—290KW Allis Chalmers Rotary Converter, 6 phase, 275 DC, perfect. (all the above with 6900/13000 and/or 2300/1000 primary transformers)
- 2—150KW MG Sets, Westinghouse, rebuilt.
- 2—150KW MG Sets, General Electric and Westinghouse.
- 1—200KW MG Set, Westinghouse, rebuilt.
- 1—200KW MG Set, General Electric, perfect.
- 2—150KW Allis Chalmers MG Sets, 275 DC volt, excellent, 220-440 AC volt.
- 1—300KW Westinghouse, 600 volt MG Set, rebuilt.
- 2—300KW Westinghouse, 600 volt, 6 phase, Rotary Converters.
- 4—500KW Westinghouse, 600 volt, DC, 6 phase, Rotary Converters.
- 1—500 KW HCC-6 Rotary Converter, 6 phase, 600 volt DC.
- 1—Cummins 125 KW, Diesel with 250 volt DC Generator.
- 1—G. M. C. Diesel Plant with 60 KW Generator, 275 volt DC.
- 1—D-13,000 Caterpillar Diesel with 75 KW Generator, 275 volt DC.
- 1—Allis Chalmers Natural Gas Engine with 100KW Generator, 275 volt DC.
- 1—700 H. P. Shaft Hoist, complete.
- Complete steam plant, will sell all or any part. Boilers, like new, 1100 H. P. and 500 H. P. Also transformers, turbines, etc.
- 2—Complete, Tipples with Cleaning Plants, "2 all steel."

### MISCELLANEOUS

- Battery Supply Tractors, rubber tired.
- 1—Cantrell Air Compressor on rubber tires.
- 10—Air Compressors, 1 H.P. to 40 H.P.
- 1—Ingersoll Rand Air Compressors, 24" overall height on rail trucks.
- 40 Mine Pumps, all types.
- 1—Differential 40 Passenger Man-Trip Car.
- 6—MSA Rock Dusters.
- 1—American Mine Door Track Cleaner—new.
- 3—Phillips Carriers.
- 2—Barber Greene self propelled Bucket Elevators.
- Pipe, Plastic, Steel, Transit, all sizes 1" to 6".
- 45 Mine Cars, drop bottom, 42" Ga.
- 30 Mine Cars, drop bottom, 44" Ga.
- 100 Mine Cars, 18" high, end dump, 44" Ga.
- 100 Mine Cars, end dump and drop bottom, 29" high, 48" Ga.
- 1—10 ton Mine Car Scale with Recorder.
- 1—150 ton Railroad Track Scale.
- 15—Brown Fayro HKL and HG Car Spotters.
- 1—12 ton Differential Slate Lorry.
- Incline Hoists, 25 to 50 H. P.
- 1—Joy 5' Aerodyne Fan.
- 1—Jeffrey 6' Aerodyne Fan.
- 1—Jeffrey 8' Aerodyne Fan.
- 1—Storage Tank, 8,000 Gallon.
- 2—Storage Tanks, 4,000 Gallon.
- 1—Storage Tank, 12,000 Gallon.
- 10,000 Five Gallon G. I. Cans, screw lids.
- 800 tons Relaying Rail 25½ to 30½.
- 10 tons Copper Trolley and Feeder.
- 300 Transformers from 1 to 2,000 KVA, 110 to 13,000 primary volts.
- 400 Electric Motors, 3 to 250 H. P.
- Huge stock of mine suppliers.

WE BUY • SELL • TRADE

# J. T. FISH

THOUSANDS OF OTHER ITEMS

LOGAN, W. VA.

SEND US YOUR INQUIRIES

PHONE 2825





# WHERE YOU BUY USED EQUIPMENT IS AS IMPORTANT AS WHAT YOU BUY ...

SEE  
**BECKWITH** FOR GUARANTEED USED EQUIPMENT  
BACKED BY A BOND!

Only your Caterpillar Dealer . . . Beckwith Machinery Company in this area . . . can issue this bond. It means that any defective parts in a "Bonded Buy" machine will be corrected up to thirty days at no cost for parts or labor, in an amount up to \$10,000. Most people with whom we have been dealing for years know that such a guarantee is unnecessary from Beckwith because we stand behind our machinery . . . new or used. But if you have not been doing business with us, we would like to discuss this plan as well as our "Certified Buy" and "Buy and Try" programs with you.

There's a common saying that goes, "If you don't know your diamonds . . . know your jeweler." Of course, most contractors and users of earthmoving equipment know their machines well. They are alert to good engine performance, track and roller wear, condition of transmission, final drives, etc. However, sometimes it is a bit difficult for even experienced owners to appraise the true value of a used machine. That's why it pays to deal with a reliable dealer like Beckwith Machinery Company. We certify that every piece of used equipment is exactly as described.

If you have any doubts about the used equipment you plan to buy, see Beckwith. Check our "Bonded Buy" machines. Also look into the "Certified Buy." We'll furnish you with a performance guarantee in writing. As for bargains in used machines in the "Buy and Try" category, we'll let you try them for a period mutually agreed upon. Each "Buy and Try" unit carries our written money-back agreement. You are the judge. No other dealer will give you such a large selection or such guarantees.

Terms can be arranged to meet your requirements. Give us a call or stop in at one of our many locations.

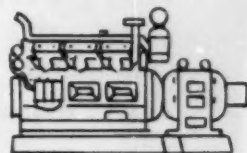
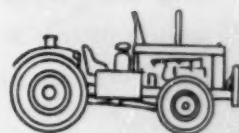
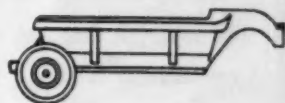
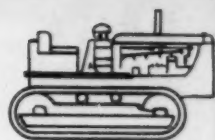
**CATERPILLAR\***

REG. U.S. PAT. OFF.

BUY AT THE  
SIGN OF THE  
BONDED BUY



\*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



**BECKWITH**  
MACHINERY CO.

6550 Hamilton Avenue • PITTSBURGH • Phone: MOntrorse 1-6900

BRADFORD, PA. • 361-369 Congress St. • Phone 3466  
CLEARFIELD, PA. • Old Town Rd. • Phone 5-9635  
ERIE, PA. • 1356 E. 12th St. • Phone 4-2494  
FARRELL, PA. • E. Broadway • Phone Di. 6-3572  
CLARKSBURG, W. VA. • U.S. Rt. 20 • Phone Main 4-5476

**Cut Your  
Strip Mining Costs  
with a  
HOSSFELD  
Prospecting  
DRILL**



**A**CTUAL field runs prove that prospecting costs can be cut with this fast working machine due to its many economical working features and quick setup time. Samples are taken continuously while drilling to accurately determine type of formation, and depth of vein or ore body, up to 110 feet deep.

- POWERFUL DIRECT DRIVE
- ONE MAN OPERATION
- ECONOMICAL 5 H. P. GASOLINE ENGINE, AIR COOLED
- LIGHT WEIGHT — COMPACT — PORTABLE



WRITE TODAY ...  
for illustrated bulletin  
"Take the guesswork  
out of Mining"

Designed to fold into a half-ton pickup, trailed in the field on its own chassis, or dismantled for easy packing over rugged terrain.

**Hossfeld Mfg. Co.**

442 W. 3rd St., Winona, Minnesota

## ADVERTISER'S INDEX

JANUARY, 1958

Beckwith Machinery Company	2, 3, 13, 14, 15, 16, 27
J. T. Fish	26
L. B. Foster Co.	25
Furnival Machinery Co.	6
Highway Equipment Company	Cover, 2nd Cover, 23, 3rd Cover, 4th Cover
Hossfeld Mfg. Co.	28
Lee Supply Co.	5
Licking View Tool and Machine Co.	5
William Lubrecht, III	25
Harold C. Lusk Co.	5
Manitowoc Engineering Corp.	4
Moon & Sons, Inc.	5
Northeastern Supply Co.	24
Ohio Machinery Co.	13, 14, 15, 16
Salem Tool Co.	1
Schroeder Brothers Corp.	21
T. L. Simpson	25
Spray Products Corporation	28
Frank Swabb Equipment Co., Inc.	8, 25
Walker Machinery Co.	13, 14, 15, 16



## A TREASURED OIL PAINTING OF THE ONE YOU LOVE

Now you can have a beautiful portrait in vibrant oil colors by one of our professional artists. This life-like 12 x 16 painting, handsomely framed in limed oak, will become a cherished possession.

Here's all you do. Send us a snapshot (any size), with complete color description of eyes, hair, clothing and person's age. In a few short weeks you will receive your portrait.

Please send check or money order. Postage prepaid.

\$25.00

**ED LURIE, Dept. CR**  
67 Warren St., Roxbury, Mass.

## Quick starts down to 65° BELOW ZERO for Diesel and gasoline engines

SPRAY STARTING FLUID, with the propellant used in the pressurized can, insures quick starts for Diesel and gasoline engines in temperatures as low as 65° F. below zero and withstands 180° F. heat. This combustible propellant was developed after two years of research.

SPRAY STARTING FLUID pressurized with our inert propellant is absolutely safe and odorless in storage.

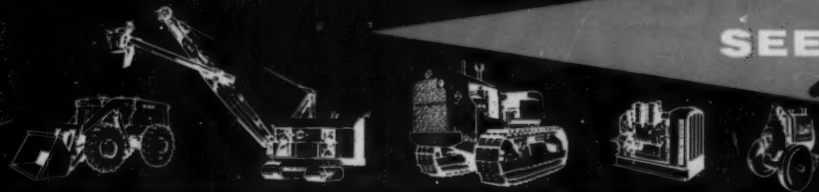
SPRAY STARTING FLUID is sold through distributors, wholesalers and their dealers located throughout the United States and Canada.

**SPRAY PRODUCTS CORPORATION**  
P. O. BOX 584 • CAMDEN 1, NEW JERSEY



For the best in all types of mining  
equipment...

SEE *Highway* FIRST!



Allis-Chalmers HD-21  
SIEGEL COAL CO.,  
Clarion



## OLD BITUMINOUS

Old Bituminous was in a terrible way.  
Production had fallen and his mine wouldn't pay.  
The trouble, though bad, was not hard to find—  
his equipment was of the very wrong kind.  
Then along with a bright and sunny day  
came the equipment expert direct from Highway.  
He explained in detail how there'd never be  
better shovels and tractors than Lima and A-C.

So old Bituminous bought himself a few . . .  
"Merely to see what they could really do."  
Then he put them to work stripping his coal  
and watched with delight as profits reached their goal.

It's surely not surprising that throughout his mine  
Bituminous is now using the full Highway line.  
And neither is it surprising when we tell,  
"What we did for him, we can do for you as well."

Lima 2400  
CLARK & KRCHMAR COAL CO.,  
Portersville



*Highway* EQUIPMENT  
COMPANY



Allis-Chalmers • Lima Shovels, Cranes, Draglines • Master  
General Motors Diesel Engines • Power-Pack Conveyors  
Gar Wood • Lima Roadpackers • Burmeister Mixers and Bins  
Michigan Tractor Shovels and Excavator-Cranes  
Thor • Jaeger

6465 HAMILTON AVE. • PITTSBURGH 6, PA.





Allis-Chalmers HD-16 . . . Freebrook Corporation, Kittanning, Pa.

## It pays to build your production around equipment from *Highway*

Strip operators everywhere agree that the fastest way to boost production and increase profits is to standardize on equipment from Highway.

So, whether you need a tractor, shovel, pump or any other type of equipment, call your Highway representative—today!

AA-6851



*Highway*

### HIGHWAY EQUIPMENT COMPANY

6465 Hamilton Ave. • Pittsburgh 6, Pa.

Allis-Chalmers • Lima Shovels, Cranes, Draglines • Master  
General Motors Diesel Engines • Power-Pack Conveyors  
Gar Wood • Lima Roadpackers • Thor • Jaeger  
Michigan Tractor Shovels and Excavator-Cranes